

**Attachment I: APPLICATION FORM**  
**INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT**  
**CLEAN WATER ACT SECTION 319**  
**Nonpoint Source Pollution Management Program**

<b>Use this form to apply for <u>Section 319 Nonpoint Source Pollution Grants.</u></b> <b>This Application <u>Must</u> Be Typed &amp; <u>Must</u> Be Submitted on this Form or an Identical Copy!</b>		
<b>1.</b>	<b>Name of Project:</b> Prioritizing the Remediation of Orphaned Brine Disposal Sites	
<b>2.</b>	<b>Name of Organization Sponsoring the Project:</b> Indiana Department of Natural Resources, Division of Oil and Gas	
<b>3.</b>	<b>Address of Sponsor:</b> 402 West Washington St., Rm. 293, Indianapolis, Indiana 46278-1996	
<b>4.</b>	<b>Sponsor's Taxpayer ID Number:</b> 35-6000158-T5	
<b>5.</b>	<b>Type of Organization (Municipality, County Government, State, Federal, University, Nonprofit):</b> State Government (IDNR); note that part of project will be done in cooperation with the US Geological Survey—Federal Government	
<b>6.</b>	<b>Primary Contact person: Name &amp; Address; Affiliation:</b> Michael P. Nickolaus; Indiana Department of Natural Resources, Division of Oil and Gas; 402 West Washington St., Rm. 293, Indianapolis, Indiana 46278-1996; Title: Assistant Director, Indianapolis office	<b>Telephone, FAX, e-mail:</b> (317) 232-4055 (317) 232-1550--fax mnickolaus@dnr.state.in.us
<b>7.</b>	<b>Project Coordinator, if different from #6:</b> Rusty Retherford; Indiana Department of Natural Resources, Division of Oil and Gas; 3101 N. Green River Rd., Suite 510, Evansville, Indiana 47715; Title: Assistant Director Field Operations	<b>Telephone, FAX, e-mail:</b> (812) 477-8773 (812) 477-8952 idnr@worlddevansville.net
<b>8.</b>	<b>Proposed Start Date:</b> July 1, 1999	<b>Ending Date:</b> June 30, 2001
<b>9.</b>	<b>Project Watershed and Waterbody:</b> Lower Wabash River Basin; 05120209, 05140202, 05120113	
<b>10.</b>	<b>NPS Management Plan Objectives Fulfilled by This Project [see instructions]:</b> 12a, 12c, 30a, 30c, 32a, 32c, 32d	
<b>11.</b>	<b>Total Section 319 Funds Requested:</b> \$ <u>112,500</u> <b>Plus Match Funds or In-kind Match Services</b> <b>[25% or more of Total Project Cost]:</b> \$ <u>37,500</u>	

	<b>Equals Total Project Cost: \$ <u>150,000</u></b>	
<b>12.</b>	<b>Has a Watershed Management Plan Been Completed for this Watershed? No</b>	<b>If No, Will a Plan be Completed by Project End Date? Yes (site ranking plan.)</b>

### 13. BUDGET:

EXPENSE ITEM	319 GRANT	MATCH (Non-Federal)	
		Cash	In-kind
Personnel	\$ 4,000		\$ 7,690
Fringe Benefits	\$ 1,300		\$ 2,510
Travel			
Equipment (Explain Below)	\$ 5,200		
Supplies (Explain below)	\$ 1,000		
Sub-Contracts (USGS)	\$ 91,000		
Laboratory			
Cost-share			
Personnel (IGS-GIS coverage)	\$ 10,000		
Other (Site remediation and related travel)		\$26,800	
Indirect Costs *			
<b>TOTAL PROJECT COSTS</b>	<b>\$112,500</b>	<b>\$26,800</b>	<b>\$ 10,200</b>

\*State universities and state agencies are not eligible to enter costs on this line item.

### BUDGET SUMMARY

**TOTAL SECTION 319 FUNDS..... \$ 112,500**

**CASH MATCH\*\* ..... \$ 26,800**

**IN-KIND MATCH\*\*\* ..... \$ 10,200**

**TOTAL MATCH ..... \$ 37,500**

**PROJECT TOTAL ..... \$ 150,000**

**\*\* Source(s) of Cash Match:** \_\_\_\_\_

**\*\*\*Source(s) of In-kind Match:** IDNR, Oil and Gas Environmental Fund \_\_\_\_\_

**Describe Equipment:** Global positioning equipment purchase; upgraded GIS software

**Describe Supplies:** Computer supplies, equipment repair and shipping

**14. WATER QUALITY PROBLEM:** Describe the water quality problem that you will address with this project. Include references to any data that supports your assessment of the water quality problems. Include a description of the land use, human activities, ecosystem characteristics, and other information that will clearly describe why this project is suited to addressing the concerns that you have identified. Southwestern Indiana has the highest number of orphaned sites (1329) that were formerly used for oil and gas production. The counties with the largest number of sites include Posey (389), Gibson (312), Pike (146), Spencer (146), and Vanderburgh (97). Before current regulation, the brines were often disposed into unlined pits or ponds and many of the sites were filled. **Orphaned sites, those lacking an identifiable owner to be responsible for site restoration, continue to be a potential source of soil salinization and ground water contamination. Local property owners have not historically had sufficient funds to clean up sites.**

The Indiana Department of Natural Resources, Division of Oil and Gas, (IDNR) has the legal authority to enter properties and some funding to remediate orphaned sites through the Oil and Gas Environmental Fund (Indiana Code 14-37-10). The Southwest Indiana Brine Coalition, through an agreement with the Four Rivers RC&D Area (SWIBC), have funding to hire a coordinator to locate previously unknown brine contaminated sites, collect information to prioritize their remediation, receive public input, compile technical information for demonstrations of site restoration, and evaluate that information on test plots. Some information about these sites has been compiled for Pike County by the Indiana Geological Survey but not for the other counties. **The SWIBC has requested assistance from the IDNR to catalog information about known contamination sites, create the information base necessary to prioritize sites and to remediate the sites that require more than revegetation efforts.** The IDNR has draft criteria to rank sites for restoration but they and the SWIBC lack basic data to evaluate which sites would most benefit from earlier restoration. Existing efforts have also concentrated on surface evaluations and revegetation and not on ground water conditions.

The SWIBC has encouraged the IDNR, with its cooperator, the U.S. Geological Survey, to apply for funding to identify geographic locations and dimensions of orphaned sites not already identified, to expand existing GIS coverages and create a database of site data and related soil, geologic and other information, to apply surface EM resistivity to evaluate subsurface soil and ground-water salinity of selected sites, and to provide funding to revegetate up to three orphaned sites.

**15. APPROACH TO SOLVING THE PROBLEM:** Describe the project that you are proposing. Tell

**why this project will improve water quality in your watershed. Include the process used to develop this proposal and identify the people and groups who were involved.** The project proposes to locate orphaned brine sites, rank them according to their potential environmental impact, and revegetate or remediate selected orphaned brine sites. The project will work with existing efforts of the SWIBC by improving and expanding GIS-based data needed to rank where scarce restoration dollars would be best spent. The GIS coverages will be developed for use on IDNR and SWIBC computer resources to catalog site data and physical properties needed to rank sites for remediation. Geophysical surveys and sampling of soils and water will be done at selected sites to classify surface and deeper subsurface salinity. The IDNR, in consultation with the SWIBC, will jointly prioritize sites with the greatest potential benefit from remediation. The outcome will include the IDNR-sponsored remediation of three sites, as selected using this process.

Site Identification. A GIS-based coverage of oil and gas wells compiled by the Indiana Geological Survey will be obtained (Estimated \$10,000 to partly fund separate proposed IDNR/IGS effort for IGS to finalize coverage). Orphaned brine disposal sites in the 5 counties (Pike Co. sites already located) will be precisely located by USGS and IDNR staff using global positioning system techniques. Computerized water- well data from the IDNR, Division of Water, previously released regional scale GIS-based maps of hydrogeologic setting from the Indiana Geological Survey, and soil texture maps from the Natural Resources Conservation Service will be used to select areas vulnerable to ground-water contamination. Vulnerable surface water will be identified using 1:24,000 scale GIS coverages of hydrography to be developed under a separate USGS-IDNR project. Other coverages to be compiled will be estimated depth to water in nearby wells, coarsely textured soil associations and unconfined ground water. Digital orthophoto quadrangle map coverages will be used to evaluate the relative distance from mapped sites to residences that use local ground water. The SWIBC and IDNR will use the GIS facilities available to the Patoka Watershed Steering Committee, the USGS, and the IDNR to prioritize sites for remediation.

Site Evaluations. The top five sites selected above will be evaluated for soil and ground-water salinity by the SWIBC, IDNR, and USGS, using visual observations of vegetative stress and near-surface and deeper electromagnetic-induction resistivity surveys. Equipment for the surveys will be provided by the USGS and the NRCS, Illinois office. The EM-38; cooperatively supplied by the NRCS, Illinois will be used to survey soil salinity and the EM-34 to be supplied by the USGS (a \$1,000 USGS in-kind contribution) will survey deeper ground-water salinity at depths up to 130 feet in homogenous sands but less in finer grained deposits. A USGS researcher, James Otton, has committed to collect and analyze soil samples from up to four sites for trace elements that are suspected to limit growth of replanted vegetation (boron, bromide, and iodide) and for other constituents (A \$10,000, USGS in-kind contribution). An observation well will be installed by the USGS at three of the five sites through unconsolidated sediments and geophysically logged to examine the relative salinity of ground water under each site.

Setting Priorities for Site Mitigation: The IDNR and SWIBC orphan site coordinators will examine the data provided by the USGS and will decide which of the sites should receive attention for remediation. The USGS will provide technical assistance with examination of the data.

Site Mitigation: The four sites most likely to benefit from remediation will be targeted by the SWIBC and the IDNR for site remediation, using project funds for revegetation and State funds from the Oil and Gas Environmental Fund for more serious cases. Revegetation efforts will be based on information gathered by the SWIBC and possibly the planting of halophytic plants. Remediation associated with ground-water contamination has in the past involved removal of material from the orphaned site to a safe disposal facility and covering of the site with a low permeability material to inhibit further leaching of material from the unsaturated zone. The most recent IDNR remediation efforts have involved some combinations of removal or

isolation by in-place solidification of onsite material and removal of tanks and other sources of contamination. Although the final costs are not specifically known, recent examples of these clean up costs have ranged from \$5,000 per site to about \$20,000 per site. If ground water remediation is involved, considerably greater resources may be involved. This project component represents an in-kind financial commitment by the IDNR to improving water. Future remediation made possible by this project potentially exceeds the amount of the requested grant.

16. **MONITORING: Document the existing water quality problem. Reference any data that has been collected. Tell how you will monitor changes in water quality resulting from this project. Also describe any monitoring activities designed to identify changes in land use, the success of outreach efforts, or other goals of the project. (Note: if water quality testing is to be done as part of the project, a plan for quality assurance and quality control will need to be developed. The Watershed Management Section will assist you with developing this Quality Assurance Project Plan [QAPP] in accordance with USEPA guidelines.)**

Otton and others (USGS, Open-File report 97-448, 1997) documented saline soil conditions and salt scarring associated with 43 active and inactive oil production sites in adjacent areas of Illinois. Ground-water contamination was not examined as part of that investigation. Anecdotal occurrences of oil-production brine related contamination have been described for several areas of southwestern Indiana. Because the project involves both assessment of existing conditions and implementation of best management practices through site remediation, monitoring will be done jointly by the IDNR and the SWIBC after the project is completed. Following the remediation of the sites, site inspectors from the IDNR will visit the sites at 1, 2, and 5 years from the date of remediation to visually determine the restoration of natural conditions and inspect for the presence of surface seeps and vegetative stress that would indicate effects of brine residue on future land use. If ground water salinity that affects ground- water supplies is present, sampling and future surveys can be done to verify long-term changes in water quality.

17. **PUBLIC INVOLVEMENT:** How will the public be involved in your project? How will you make your community aware of the project? Who will be included in planning and decision making? Who are the people or groups in your community, or across the state, that support this project? Attach letters of support showing what role groups will play in this project [at the end of the application package]. The IDNR and USGS will provide data and prepare coverages to assist the SWIBC coordinator in presenting the magnitude of the orphan sites problem. IDNR and USGS representatives will attend SWIBC meetings and public outreach activities and communicate draft products and data to the joint SWIBC/IDNR prioritization of sites for remediation. The SWIBC representatives (Ms. Priscilla Kelly and David Elgin) have met with the IDNR and USGS and expressed their need for the project. Both indicated that the IDNR/USGS effort will provide needed information to their effort and needed resources to sustain the momentum of site remediation after both projects end. The USGS and IDNR will also cosponsor a training session of two to three IDNR inspectors and the SWIBC coordinator to enable future site GPS location and identification. Ms. Kelly indicated that the Patoka South Fork Watershed Steering Committee also supports this effort through contribution of their GIS facilities. The current effort will contribute additional sites to demonstrate revegetation and remediation technology to local stakeholders. The combined information will enable the IDNR project chief and the SWIBC coordinator to work together with property owners on future efforts to identify sites for remediation funding.

**18. PRODUCTS: What products will be produced by this project? Include quarterly and final reports, publications, field days, workshops, news releases or other outreach efforts, water quality data, water quality improvements, practices applied, and any other products. List and number the products.**

The project will produce several tangible results that will improve water quality conditions in the study area and throughout the state:

(1) Development of GIS coverages and procedures, in ARC-VIEW and ARC-INFO formats, to enable sites to be objectively ranked for remediation. These products have been requested by the SWIBC and IDNR as necessary to current and future orphaned brine site mitigation. The coverages and programs will be designed for use on IDNR and local (Patoka group) GIS programs by local and state stakeholders (local and state importance),

(2) Application of more deeply probing geophysical techniques to estimate whether ground-water salinity and soil salinity are affected. Previous projects (NRCS and USGS) in the area have only examined soil salinity.(local and state importance) (A publicly available USGS report, to be authored jointly by the USGS and IDNR investigators, will document the coverages, methods and data in products (1) and (2)).

(3) Mitigation of three to five sites identified by the process in this study (local importance).

Historic disposal practices of oil and gas brine have been identified as a major nonpoint-source pollution problem, both nationally and in Indiana. The USEPA and the U.S. Department of Energy, Fossil Energy Program, have devoted considerable resources to develop procedures to rank and remediate former brine sites. This project would provide the necessary regional and local information to adapt those techniques to identify and remediate orphaned sites with the greatest potential to benefit local ground-water quality. These project has a high likelihood to result in continued water quality benefits after its life.

**19. LOCATION: Where is the project located? What are the geographic characteristics of the project area? Attach a map showing the location of the project watershed and the area affected by the project, including county and township boundaries, communities, roads, streams, and any other features that help to explain the project. Also locate the project on the attached map of Indiana in black ink.**

The project will be located in Pike, Gibson, and Posey Counties. The project waterbodies affected by the work include the Patoka River (Pike and Gibson Counties), Pigeon Creek and tributaries (Gibson County), and the Wabash River (Gibson and Posey Counties) and associated aquifers in those counties.

**20. Project Authorization:**

\_\_\_\_\_  
Signature of Sponsoring Organization's Authorized Representative

\_\_\_\_\_  
Date

Mr. James Slutz  
Typed Name of the Representative

Division Director  
Title of the Representative

(317) 232-4055  
Telephone Number

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**If you have questions or need more information about the program, contact:**

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**Mail completed applications to:**

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**Applications submitted for FFY 1999 or 2000 funding must be received  
no later then COB November 30<sup>th</sup>, 1998**